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Reply to Office Action mailed August 20, 2008

### R E M A R K S

#### Claim Amendments

In claim 1, the terminology of "a chemiluminescent compound" was deleted.

Claims 5, 6, 12, 13, 18 and 19 were canceled.

New claims 20 and 21 include the peroxides of an imidazole derivative that were previously recited in claim 18.

#### Claim Objection

Claim 9 was objected to for the reasons set forth at the top of page 4 of the Office Action.

Claim 9 was canceled hereinabove.

Withdrawal of the claim objection is respectfully requested.

#### Anticipation Rejection under 35 USC 102

Claims 1, 3, 6, 13 and 17 were rejected under 35 USC 102 as being anticipated over JP 2002-047208 (Akiya et al.) as evidenced by DiMascio et al. (J. Am. Chem. Soc., (1989), 111:2909-2914) for the reasons stated on pages 4 to 5 of the Office Action.

Previous claim 5, which recited that the compound recited in claim 1 was a peroxide of an imidazole derivative, was not included in this anticipation rejection. This anticipation

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rejection was therefore based only on the previous recitation in the claims of a chemiluminescent compound (which recited a peroxide of an imidazole derivative).

Since the present claims do not recite a chemiluminescent compound, withdrawal of the 35 USC 102 rejection is respectfully requested.

Claims 5 and 12 were rejected under 35 USC 103 as being unpatentable over JP 2002-047208 (Akiya et al.) and further in view of Frandsen et al., Acta Chem. Scan., (1991) 45:627-631 for the reasons stated in the last two paragraphs on page 6 and the first and second paragraphs on page 7 of the Office Action.

It was admitted in the Office Action that Akiya et al. do not teach the use of a peroxide of an imidazole derivative.

Claims 18 and 19 were rejected under 35 USC 103 as being unpatentable over JP-2002 (Akiya et al.) in view of Frandsen et al. and further in view of Kimura et al., ITE Letters on Batteries, New Technologies and Medicine, Vol. 1, No. 3, pp. 418-421, (2000) or Tsunenaga et al., ITE Letters on Batteries, New Technologies and Medicine, (2003), 4:633-638 for the reasons beginning in the last paragraph on page 7 and continuing to the top of page 9 of the Office Action.

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It was admitted in the Office Action that Akiya et al. do not teach the compounds listed in claim 18 (see new claims 20 and 21, which replace claim 18).

It was admitted in the Office Action that Kimura et al. and Tsunegaga et al. do not teach that the imidazole peroxide of 2-(2-hydroxyphenyl)-4,5-diphenylimidazole generates singlet oxygen.

#### Applicants' Rebuttal to the Obviousness Rejections

Akiya et al. do not teach or suggest that a peroxide of an imidazole derivative is capable of generating singlet oxygen.

Akiya et al. disclose that an organic peroxide capable of generating singlet oxygen is a peroxide derived from at least one group selected from the group consisting of benzene, naphthalene, anthracene, 1,3-diene, and cyclohexadiene type organic compounds (including natural products), and inorganic chemicals such as hydrogen peroxide) (see paragraph [0004] of Akiya et al.).

Frandsen et al. relate to a peroxide of a imidazole derivative. The imidazole derivative disclosed in Frandsen et al. is not a benzene, naphthalene, anthracene, 1,3-diene, or a cyclohexadiene type organic compound, as disclosed in Akiya et al.

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Frandsen et al. do not teach or suggest treating cancer or inducing the sudden death of cancer cells as recited in applicants' claims.

It is therefore respectfully submitted that one of ordinary skill in the art would not consider combining Akiya et al. with Frandsen et al.

Moreover, even assuming *arguendo* that such references are combined, one of ordinary skill in the art would not arrive at applicants' presently claimed invention based on the disclosures of such references.

Kimura et al. disclose only that peroxides of certain imidazole derivatives emit chemiluminescence. Tsunenaga et al. have a similar teaching as Kimura et al.

Kimura et al. and Tsunenaga et al. do not teach or suggest that these peroxides are capable of generating singlet oxygen, as recited in applicants' claims.

Kimura et al. and Tsunenaga et al. do not teach or suggest treating cancer or inducing the sudden death of cancer cells as recited in applicants' claims.

It is therefore respectfully submitted that one of ordinary skill in the art would not consider combining Akiya et al. and Frandsen et al. with Kimura et al. or Tsunenaga et al.

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Moreover, even assuming *arguendo* that such references are combined, one of ordinary skill in the art would not arrive at applicants' presently claimed invention based on the disclosures of such references.

Furthermore, applicants' present claims provide unexpected and remarkable advantages over those disclosed in Akiya et al. Akiya et al. state that increasing the temperature of an affected area of a patient with external irradiation is effective for promoting decomposition of the peroxide (see paragraph [0007] of Akiya et al.). In contrast thereto, the peroxides of imidazole derivatives as recited in applicants' present claims simultaneously generate both heat and singlet oxygen and thus can effectively generate singlet oxygen without heating the affected area externally (see paragraph [0020] of the present specification).

Such advantages of applicants' present claims are specifically supported on Table 2 of the present specification, which shows that the compounds used in applicants' present claims generate a reaction heat of about 20 to 90 kcal/mol, simultaneously with generation of singlet oxygen.

Table 2 on page 25 of the present specification is reproduced as follows:

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Table 2

Entry	Solution Reaction heat <sup>a</sup> / kcal/mol	Yield of imidazole <sup>a</sup> %	Solid reaction heat / kcal/mol	Solid reaction imidazole yield %	Relative amount of chemiluminescence <sup>b</sup>
Chemical formula A	53.8	13	18.7	45	1
Chemical formula B	66.3	~0	61.0	~0	160
Chemical formula C	--- <sup>c</sup>	--- <sup>c</sup>	53.6	--- <sup>c</sup>	1.02
Chemical formula D	--- <sup>c</sup>	--- <sup>c</sup>	47.6	--- <sup>c</sup>	0.232
Chemical formula H	46.0	3	35.3	~0	1.6
Chemical formula I	--- <sup>c</sup>	--- <sup>c</sup>	91.4	--- <sup>c</sup>	0.58
Chemical formula J	48.7	49	52.3	50	0.60
Chemical formula K	22.4	58	15.0	55	~0
Chemical formula L	54.0	~0	50.5	~0	2.2

a) Reaction was started with 1N KOH/MeOH

b) Relative luminescence efficiency while Chemical formula A is defined to be 1 for reference.

c) No measurement.

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Based on the above, it is seen that applicants' presently claimed invention achieves unexpected results over that of Akiya et al. by using an imidazole as the source of peroxide.

Withdrawal of each of the 35 USC 103 rejections is thus respectfully requested.

Reconsideration is requested. Allowance is solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

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Respectfully submitted,



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